

CLAIMS

What is claimed is:

1. A fan cooling system with high availability comprising:
 - a first fan coupled with a first motor for creating a first air flow;
 - a second fan coupled with a second motor for creating a second air flow;
 - a duct system for conveying said first air flow and said second air flow to at least one heat sink; and
 - a control system coupled with said first fan motor and said second fan motor.
2. The fan cooling system of Claim 1 wherein said first motor and said second motor are removably coupleable with said fan cooling system.
3. The fan cooling system of Claim 1 wherein said first motor and said second motor are configured to operate at variable speeds.
4. The fan cooling system of Claim 1 wherein said control system further comprises:
 - a motor performance monitoring unit configured to determine a performance metric of said first motor and a performance metric of said second motor.
5. The fan cooling system of Claim 4 wherein said motor performance monitoring unit comprises:
 - a first tachometer configured to determine the rotational speed of said first motor; and
 - a second tachometer configured to determine the rotational speed of said second motor.
7. The fan cooling system of Claim 4 wherein said motor performance monitoring unit comprises:

a current monitoring device for determining the amount of current used by said first motor; and

a second current monitoring device for determining the amount of current used by said second motor.

8. The fan cooling system of Claim 4 wherein said motor performance monitoring unit comprises:

a comparator for comparing a measured performance metric of said first motor with a pre-defined parameter and for comparing a measured performance metric of said second motor with a pre-defined parameter.

9. The fan cooling system of Claim 8 wherein said motor performance monitoring unit further comprises:

a power control subsystem; and

a controller coupled with said power control subsystem and configured to generate a command to said power control subsystem in response to a signal from said comparator.

10. The fan cooling system of Claim 9 wherein said controller causes said power control subsystem to dynamically alter the operating speed of said second fan when said performance metric of said first motor exceeds said pre-defined parameter.

11. The fan cooling system of Claim 4 wherein said motor performance monitoring unit comprises:

a state machine for determining when said performance metric of said first motor exceeds a pre-defined parameter and for automatically generating a command to a power control subsystem to dynamically alter the operating speed of said second fan.

12. A redundant fan cooling system comprising:

a plurality of variable-speed fan motors removably coupleable with said redundant fan cooling system;

a plurality of fans, each of said plurality of fans coupled respectively with one of said plurality of variable-speed fan motors;

a ducting system for conveying air flow from each of said fans to a heat dissipating device; and

a controller for dynamically changing the operating speed of at least one of said plurality of variable-speed fan motors in response to a measured performance metric.

13. The redundant fan cooling system of Claim 12 wherein said controller further comprises:

a monitoring unit configured to determine a performance metric of each of said plurality of variable-speed fan motors.

14. The redundant fan cooling system of Claim 13 wherein said monitoring unit comprises:

a current monitoring device for monitoring the amount of current used by each of said plurality of fan motors.

15. The redundant fan cooling system of Claim 13 wherein said monitoring unit comprises:

a tachometer to monitor the rotational speed of each of said plurality of variable-speed fan motors.

16. The redundant fan cooling system of Claim 12 wherein said controller further comprises:

a comparator for comparing said measured performance metric with a pre-defined parameter.

17. The redundant fan cooling system of Claim 16 wherein said controller dynamically changes the operating speed of said at least one of said plurality of variable-speed fan motors when said measured performance metric exceeds said pre-defined parameter.

18. The redundant fan cooling system of Claim 12 wherein said controller further comprises:

a state machine for determining said measured performance metric exceeds a pre-defined parameter and for automatically generating a command to a power control subsystem to dynamically alter the operating speed of said second fan.

19. A method for providing redundant availability in a fan system comprising:

coupling each of a plurality of fan motors with a respective fan;
configuring a duct to guide air flow from said plurality of fans to a heat sink;
comparing the performance of each of said plurality of fan motors with a pre-defined parameter; and

selecting a fan motor speed for one of said plurality of fan motors based upon said comparing.

20. The method as recited in Claim 19 further comprising:

receiving a measured performance metric from a monitoring device; and using a comparator to compare said measured performance metric with said pre-defined parameter.

21. The method as recited in Claim 20 wherein said monitoring device comprises:

a current monitoring device for monitoring the amount of current used by each of said plurality of fan motors.

22. The method as recited in Claim 20 wherein said monitoring device comprises:

a tachometer to monitor the rotational speed of each of said plurality of fan motors.

23. The method as recited in Claim 19 further comprising:

operating each of said plurality of fan motors at a first operating speed;
determining that the performance of a first fan motor of said plurality of fan motors exceeds said pre-defined parameter;

disengaging said first fan motor; and
changing the operating speed of a second fan motor of said plurality of fan motors
to a second operating speed.